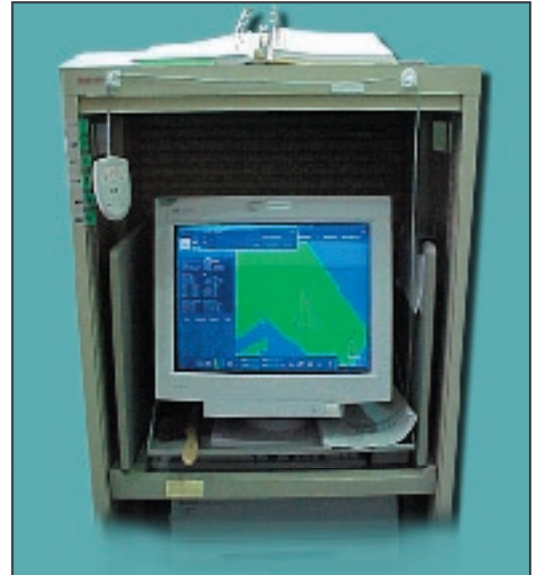


# NASA Success Story

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## Meteorological Range Safety Support System

ENSCO, Inc., of Cocoa Beach, Florida has developed the Meteorological And Range Safety Support System/Eastern Range Dispersion Assessment System (MARSS/ERDAS). The system was developed under a Small Business Innovation Research (SBIR) contract with NASA at Kennedy Space Center (KSC). The system was developed to help NASA and the Air Force predict atmospheric and weather conditions as well as the location and dispersion of possible toxic or hazardous plumes and clouds. The MARSS/ERDAS replaces an outdated computer system (and some manual processes) and can acquire, process and disseminate near real-time meteorological data. The system's software incorporates a meteorological model and programs that use toxic diffusion algorithms to predict the movement of toxic smoke resulting from rocket exhaust or catastrophic launches failures. The system can display graphics, text, and map overlays and can also generate audible and visible alerts when predetermined weather constraints are violated.



ENSCO developed the MARSS/ERDAS as a system of interconnected computer workstations. The MARSS/ERDAS consists of three components, the Preprocessor (PPR), the Monitoring and Display Station (MDS), and the Regional Atmospheric Modeling System (RAMS) Processor (RP). The PPR acquires the data, reformats the data stream, applies quality control analysis to the meteorological data, and disseminates all results to the MDS. Range Safety and weather personnel use the MDS to display near real-time meteorological data, display results from internal toxic/hazard prediction algorithms, and plot model output received from external computer systems. The RP uses the RAMS mesoscale forecast model to produce a 24-hour weather forecast.

The MARSS/ERDAS provides the following improvements to the older MARSS system it replaced:

- RAMS mesoscale forecast modeling
- Isentropic Analysis Package for data assimilation
- Hybrid particle and concentration transport for toxic/hazard prediction
- Local execution of the rocket effluent exhaust diffusion model
- Local execution of the blast effects predictor
- Addition of five MDS workstations
- Addition of two portable MDS workstations with dial-in capability

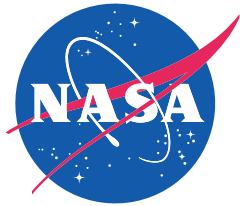
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### Point of Contact

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# NASA Success Story

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## Meteorological Range Safety Support System

MARSS/ERDAS workstations have been installed in Air Force 45th Space Wing Safety Office (45 SW/SE) operational and administrative facilities. The 45 SW/SE also maintains a fully functional portable capability, permitting remote access through a dial-up connection. Additional units are deployed in the operations section of the 45th Weather Squadron as well as at KSC Launch Complex 39 (Launch Control Centers 1 and 3), the Radiation Control Center, the Environmental Health office, and the Emergency Operations Center.

**NASA Involvement** The MARSS/ERDAS project originated as a NASA funded Phase II SBIR for the production of a prototype Meteorological Monitoring System (MMS). NASA and the USAF provided technical support for the base MMS. That original system was designed to acquire a broad set of meteorological data used to detect the presence of hazardous conditions in order to alert NASA and USAF personnel. Additional NASA funding extended the original Phase II SBIR funding to provide simple toxic hazard prediction capability. The combined capabilities and flexible system architecture of the MMS attracted the attention of the 45th Space Wing Safety Office, which in 1995 focused on the MMS technology as the foundation for an improved MARSS system. In 1996 the USAF partnered with NASA to award the MARSS Replacement (REPL) contract to ENSCO as a NASA Phase III SBIR. Under this contract ENSCO totally replaced the old MARSS system that had been in service since 1988 and was based on older hardware and software technology.

**Social/ Economic Benefit** The MARSS/ERDAS is the result of a highly successful technology transfer from innovative research to operational product. This system provides a broad suite of technological capabilities that enhance user efficiency. Using the MARSS/ERDAS system saves money by consolidating functions and integrating communications tools. Using the MARSS/ERDAS, a single user can now perform the tasks that previously took two to three people. The enhanced prediction capabilities and speed of the new system enhance communications between Government safety personnel and local town, county, and state emergency response planners and personnel.

**Industry Partner**  
ENSCO, Inc.

**NASA Partner**  
Kennedy Space Center

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